REMARKS

Applicant has corrected the minor informalities noted in the specification.

Applicant respectfully traverses the § 102(b) rejection of claims 1 and 2 over Badwal '349.

The present invention relates to a solid oxide fuel cell (SOFC) of a supported electrolyte fuel type, wherein a fuel electrode acts as a substrate, and an electrolyte film, which is thinner than the fuel electrode, is bonded to the electrode.

In the preparation of a SOFC, since the velocity of oxide ions permeating through the electrolyte film is low, if the electrolyte film is thick, the thick electrolyte film creates electrical resistance and becomes a rate-determining process in cell performance. To avoid this problem the electrolyte of the present invention is made thin; but structural strength must be retained, so a material other than the electrolyte film is used to ensure structural strength.

In the invention, the fuel electrode itself provides strength to the cell, so that the thickness of the electrolyte film can be decreased, in order to reduce electrical resistance and allow the cell to operate at a low temperature.

Claim 1 has been amended to more clearly reflect the above-described inventive concept, i.e., fuel electrode acts as a substrate, and has a thickness greater than a thickness of the electrolyte film, the fuel electrode thickness being 0.3 mm or more.

The Examiner contends that it is inherent in Badwal that nickel - 3 mol% yytria-zirconia -cermet has a bending strength of 500 MPa or more because identical materials have identical properties. Claim 1, however, recites that a second solid electrolyte has a bending strength of 500 MPa or more, not that the cermet fuel electrode substrate has this bending strength, so it appears that the Examiner either

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has mischaracterized or else has misunderstood the subject matter set forth in the claims.

The SOFC in Badwal '340 has an electrolyte layer between a fuel electrode and an air electrode, and uses Ni-3YSZ cermet as a fuel electrode; nevertheless, Badwal neither discloses nor suggests that 3YSZ constituting part of a fuel electrode has a bending strength of 500 MPa or more.

Moreover, in the Badwal SOFC, the electrolyte thickness is 150 μm, and the electrode is 50 μm thick, so this SOFC is a "self supporting electrolyte film type," wherein the electrolyte layer acts as a substrate and a fuel electrode, which is thinner than the electrolyte, is bonded to the electrode.

The present invention, therefore, wherein a thickness of the electrolyte is less than a thickness of the electrode, is not anticipated by Badwal.

Applicant also respectively traverses the § 103(a) rejection of claims 1-7 and 14-18 over Badding in view of Badwal, even though cancellation of claims 14-18 renders moot part of the rejection. The Examiner cited Badding as teaching a SOFC with an electrolyte layer interposed between a fuel electrode (Ni-YSZ) and an air electrode, with cermet interposed between the fuel electrode and the electrolyte layer. Badding is silent, however, regarding bending strength, and does not disclose the percentage of yttria in connection with YSZ comprising a part of the fuel electrode.

The structure of the Badding cell, moreover, is disclosed at col. 11, lines 64-67 and col. 12, lines 52-53. The electrolyte layer has a thickness of 20 μm and the respective electrode layers have a thickness of 10 μm. Hence, again, the electrolyte

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acts as a substrate, and a thinner fuel electrode is bonded thereto, which differs from the claimed invention.

As recited in claims 4-7, an underlayer is selected in accordance with the fuel electrode substrate and interposed between the electrolyte film and fuel electrode substrate to decrease resistance therebetween. In Badding, an interlayer of cermet is interposed between the fuel electrode and the electrolyte, but Badding does not disclose a relationship between the solid electrolyte material and the interlayer material.

A fuel cell according to a combination of Badding and Badwal will still be a self-supported electrolyte film type, and not a "supported electrolyte fuel type," and will not have the relationship between layers, as set forth in the present claims. When the fuel cell of the combination of these references is operated at low temperature, resistance in the electrolyte layer increases, or the cell might not even operate, contrary to the present invention. At least for these reasons, the combination of references proposed by the Examiner cannot render obvious the claims of the present invention.

In view of these amendments and remarks, Applicant requests reconsideration and allowance of the claims.

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Respectfully submitted,

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